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EDGAR DENISON MEMORIAL ISSUE

Journal of the Missouri Native Plant Society

FROM THE EDITORS

This issue pays tribute to Edgar Denison, one of Missouri's outstanding botanists. Edgar's life touched those of most members of the Missouri Native Plant Society, and everyone who interacted with him was enriched by the experience. Edgar's willingness to share his vast storehouse of knowledge helped many Missourians to develop an appreciation for nature. His keen wit and his unique personality are engraved in many people's minds. He was a supremely skilled botanist, conservationist, and gardener whose name became as synonymous with Missouri botany as that of Julian Steyermark, a friend whom he greatly admired.

George and Doug

Edgar Denison accepts the 1993 Steyermark Award from John Molyneaux.

EDGAR DENISON
1904–1993

Joanna Turner
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This issue of Missouriensis is dedicated to the memory of Edgar Denison, who died at the age of eighty-eight on August 14, 1993. He was a remarkable man with a multitude of interests and talents, and his many friends feel a great sense of loss.

Edgar was born in Stuttgart, Germany on August 31, 1904. At the time of his graduation from college preparatory school, Germany was in the midst of a severe depression. Although his father was a physician, it was financially impossible for Edgar to attend college. He went to work as a clerk in Frankfurt. Due to the continuing depression and because he was the only unmarried employee, his employer was forced to discharge him. At his father's urging he came to the United States, arriving in New York in 1927. Expecting assistance from acquaintances of his parents, he came to St. Louis, arriving with only fifty dollars and a lute, which he kept in his home for the rest of his life. The expected help was not forthcoming, but he managed to survive by working long hours at a series of menial jobs, most of which involved hard physical labor. One night job paid only thirty-five cents an hour but included a meal that supplemented his usual diet of bread. He knew very little English but managed to teach himself by "just starting talking," as he described it, and by reading a lot.

In 1932 Edgar was hired by Union Electric, where eventually he worked up to a position as assistant to an

executive vice-president, and became head of a department dealing with cost control. He remained with Union Electric until he retired in 1969 at age sixty-five.

W. Victor Wier, a friend who shared Edgar's interest in natural history and photography, introduced him to Ruth Israel, a well known jeweler, potter, and flower arranger. They were married in 1931. After living for two years in Maplewood, a suburb of St. Louis where Edgar remembered seeing many prairie plants such as downy gentian (*Gentiana puberulenta*) growing in profusion, the Denisons purchased a lot in a sparsely settled area of nearby Kirkwood. There they built the house in which they lived for sixty years. He later described the area as open country and reminisced about the bounty of dewberries he picked every summer before the area was developed. Two years after they moved there Edgar bought the lot next door and started the garden which, in time, became famous as the most extensive and beautiful wildflower garden in the St. Louis area. His interest in gardening began during childhood when his father rented some land outside of Stuttgart and grew flowers and fruit and nut trees.

Edgar's interests in both horticulture and botany were complementary. He made many contributions to both during his thirty-seven years at Union Electric and after his retirement. He formed a friendship with Edgar Anderson, a former Director of the Missouri Botanical Garden, and wrote many articles for the Garden's *Bulletin* on such subjects as fertilizers, broad-leaved evergreens, and composting. He was one of the earliest proponents of composting in the St. Louis area. The editor's introduction to one of his articles in 1968 declared he was, "An amateur naturalist of a professional status." In addition he helped train volunteers

for the Garden's "Answer Man" service. He also had close ties with the Garden's Shaw Arboretum and often led wildflower walks there. The walk held every spring was particularly popular and drew large groups of faithful admirers. In 1969 he conceived the idea of developing a prairie at the Arboretum. Years later, after the prairie became a reality, he complained in typical Edgar fashion that his suggestion had never been acknowledged.

His Kirkwood garden became a mecca for many tour groups and for friends and acquaintances. He spent countless hours gathering seeds and potting seedlings, giving thousands of them to the Missouri Botanical Garden and his friends. He even set the seedlings on the sidewalk in front of his house for interested passers-by to take. In September, 1992, he received an award from the Garden Club of America at their five-state meeting in St. Louis.

One of Edgar's biggest contributions to the Missouri Botanical Garden was made during the late 1980's when he translated the letters from German scientists to George Engelmann, the Garden's first botanist. He often spent eighty to ninety hours a month working on nineteenth century letters written in an old German script called fraktur. Although it is no longer used or taught in Germany, Edgar had learned it in school. He had to struggle with the difficult handwriting of scientists such as Louis Agassiz, and also had to contend with letters written on both sides of thin, almost transparent paper.

During his years at Union Electric, Edgar also pursued his interest in botany, which developed during his youth when he made frequent trips with his father to Switzerland, where he became intrigued by the alpine

flora. His father had many botanical books that helped him to learn the names of the plants he had seen. He began collecting books in St. Louis and studying the native plants of Missouri. When asked how he got into botany, he answered, "I simply worked myself into the field."

As part of his job at Union Electric, Edgar had to make frequent trips to the construction site of the Taum Sauk Hydroelectric Plant near Lesterville. In order to obtain a construction permit, Union Electric was required, in Edgar's words, "To do a nature job for the public." The company accepted his proposal to build a nature museum on the site. He completed the project almost single-handedly and supplied almost all of the displays from his own collections, including rocks, minerals, wildlife exhibits, and over four hundred of his photographs of native Missouri wildflowers. Joel Vance, a writer for the Missouri Department of Conservation, visited the museum and was very impressed with Edgar and his statement that Missouri needed a popular wildflower guide. After Vance discussed it with the Department of Conservation, Edgar said, "It was decided to have a book...so I wrote the book, and that was quite a job for an amateur." Thus his popular and highly regarded book *Missouri Wildflowers* was published in 1972. Now in its fourth edition, it has sold over eighty-five thousand copies, with all of the proceeds going to the Department of Conservation. Edgar's association with the Department of Conservation continued as he completed revisions and a fourth edition of his book. He also contributed articles to the *Missouri Conservationist* magazine and recently completed two illustrated articles on Missouri Oaks that appeared in the December, 1993, and January, 1994, issues.

While Edgar was working on the first edition of his book some of the staff at the Conservation Department expressed hope that a wildflower society could be formed in Missouri. Seven years later Edgar was a co-founder of the Missouri Native Plant Society and served as its first vice-president. He contributed a number of articles to *Missouriensis*, the first of which encouraged a statewide inventory of Missouri plants. Another article encouraged the use of native plants in home gardens with the requirement that they be raised from seeds and never dug in the wild. Some of his articles created controversy such as his defense of the noxious weed, purple loosestrife (*Lythrum salicaria*). He was honored by the Society in 1985 with the Erna R. Eisendrath Memorial Education Award and, in 1993, just two months before his death, with the Julian A. Steyermark Award, the Society's highest award, given only for superior contributions to Missouri botany. Edgar was the only person to have received two awards from the Society. Earlier in 1993 he completed two illustrated articles for *Missouriensis*, the beginning of what was to have been a series of articles about Missouri's plant families. The first, an "Introduction to Fruits," was published in a recent issue of the journal (*Missouriensis* 14(1):3–13), and the second, dealing with monocot families, is included in this issue.

Edgar was also a long-time member of the Webster Groves Nature Study Society and contributed many articles to its publication, *Nature Notes*. His subjects reflected his broad interests and included such topics as the definition of volcanic ash, the complicated structures of milkweed flowers, and plants as mineral indicators. He also reinstated the Botany Group which had lain dormant for years. While serving as chairman of the group, he led field trips and held monthly meetings at

which he lectured on various botanical subjects. In addition, he handed out copies of his illustrated field guides to the asters and oaks of Missouri.

Edgar was well known as a conservationist and was active in the Sierra Club, serving on the St. Louis group's executive committee for many years. He was proud of the fact that he was the longest-standing member of the group until Dr. Peter Raven, who had joined the club as a boy, came to St. Louis. Almost every summer Edgar and Ruth took extended wilderness trips in the west with the Sierra Club. Until he gave up mountain climbing at age sixty-five, he described himself as, "Basically just an old mountain goat." He once remarked to a friend that he had climbed the same mountain in Colorado four times and, "each year it got longer and higher...nature is peculiar." The Sierra Club made a large donation to the Edgar Denison Fund, which was established by the Missouri Botanical Garden in honor of his eightieth birthday.

Edgar was concerned with the protection of animals as well as plants, and he was a board member of the Humane Society for twenty years, serving as treasurer before he "retired" from the group a few years ago. He was an avid birdwatcher and was interested in all forms of wildlife. He was also a serious student of geology and collected many mineral and fossil specimens, both in Missouri and on his western trips. He gave most of the collection to museums, such as the Missouri Mines Museum near St. Joe State Park, as well as to friends who shared his interest.

One of Edgar's proudest achievements was assisting with botany classes at Washington University for seven years. He helped on field trips on which his

book was used as the field guide. He had never taken a formal course in botany and, when he was interviewed by the dean, and stated that he had no official training, Edgar said the dean just laughed and said, "We know all about you and we want you."

This extraordinary man was also a gifted self-taught artist and nature photographer. Shortly before his death he donated his collection of eighteen hundred slides of Missouri wildflowers to the Missouri Botanical Garden. He also donated thirty-four of his beautiful watercolors, which were framed through the generosity of Blanton and Peg Whitmire. These will be hung in the visitor center at Shaw Arboretum when it is completed. He supplied the drawings and most of the photographs for *Missouri Wildflowers*. Almost all of his many articles were accompanied by his excellent illustrations. When asked how he acquired this skill, he replied, "Just like everything else, by yourself." Every Christmas he sent cards which were imprinted with one of his designs. These were usually of botanical subjects and either in black and white or hand colored. These cards became collector's items and are treasured by those lucky enough to have received them.

Many people who knew Edgar were unaware of one of his greatest talents. He loved music and was a fine pianist. He frequently sat for hours at his piano playing music by Bach, Chopin, Schubert, Mendelssohn, other classical composers, and also Scott Joplin. One of his friends tells of taking him to her daughter's high school for a peformance of *Pirates of Penzance,* where he hummed along through the entire operetta. He once confessed to a friend that music was the great love of his life.

Many superlatives have been used to describe Edgar: distinguished, dean of Missouri naturalists, expert, and celebrated, among others. All of these descriptions are well deserved, for he was a man who possessed a remarkable number of talents. But Edgar will also be remembered for his humanity. He was strong-willed and could be stubborn and difficult, but he always gave freely of himself, sharing his time, his knowledge, his wonderful sense of humor, his curiosity, his enthusiasm, and his friendship. We are unlikely to see such a man again.

ACKNOWLEDGEMENTS

I am grateful to the following persons for sharing reminiscences and information about Edgar with me: Theresa and Robert Israel, Vivian Liddell, Nell Menke, Betty Nellums, Mary Ott, and Martha Riley, Archivist at the Missouri Botanical Garden Library.

TWO RECOLLECTIONS OF EDGAR DENISON

Mary Ott
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1. SPRING BEAUTY

When we moved into our first home in Glendale, we got acquainted with Ruth and Edgar Denison. We didn't know much about gardening, but we brought some orchids home with us from our two year stint in the Philippines. The first winter seemed oh-so-cold and dreary.

Nothing seemed more welcome than the announcement of the arrival of spring in the Denison's yard. Beneath the oak tree—first came the defiant Dutchman's breeches, followed by wave after wave of early spring flowers. Many of these were new to me, and I felt a very special joy and delight.

I went each day to watch spring unfurl herself for our pleasure. Our children were very young, and when we took them to Edgar's garden they squealed with glee. Our daughter, Molly, believed the fairies resided in the glittering geodes that lay about the yard. Our son, David, didn't buy into this at all, but he liked to hang out near the tent that Edgar always built around the Christmas rose. It was quite an adventure for a four year old to bundle up and hike out in the snow to peek inside the little tent and see those beautiful flowers blooming away in January!

Occasionally we would walk with Edgar in Emmenegger Park. He knew the paths so well—he often would tell us what to expect around the next bend. It was

amazing to feel so far away from the city, and yet when we climbed that last steep hill to see the hoary puccoon, all of that magic came to an abrupt halt as we gazed across the valley at the Chrysler Plant.

We are all grateful to Edgar and Ruth for sharing their love of plants. Our children are in college now, but their appreciation of nature and concern for the environment will always be with them because of those seeds carefully planted and nurtured by Edgar and Ruth.

2. THE GOLDEN LARCH

Several years after I managed to keep alive the more common plants that Edgar Denison had given to me, and after he saw that we had begun to compost leaves, one day he announced that he wanted to plant a tree that was, "A peculiar treasure in the St. Louis area." The tree, according to Edgar Anderson, was a species very little known outside the area (see Edgar Anderson's article on the golden larch in the *Missouri Botanical Garden Bulletin*, volume 54(2), February 1966). *Pseudolarix amabilis* had been discovered in southeastern China in 1853 by Robert Fortune, an explorer for the Royal Horticultural Society in England. Fortune collected seedlings and rooted cuttings that he sent back to England through the mails or in sealed, glass-sided "Wardian Cases" lashed to the masts of sailing ships, up out of the reach of damaging salt spray.

Such a story piqued my curiosity, but how the planted trees had arrived in Kirkwood pleased me even more. It seems that the trees were growing on property once owned by the Blair family. Mrs. Blair had been an official hostess for the St. Louis World's Fair in 1904.

When the fair was finally over, she was given many choice plants by friends that she had made among the exhibitors. Edgar obtained a seedling that had dropped outside the fence of the Blair property, and he gave that seedling to me.

I was pleased that he had such confidence in my gardening abilities until one day I arrived home unexpectedly and found him digging up my seedling. He announced that he wasn't sure that I had prepared the hole properly, and was just checking!

Edgar had a large specimen of this beautiful golden larch just inside his garden gate. He often discussed the fact that it saddened him that his own tree had never produced seeds. Then, just two summers ago in 1991, he couldn't have been more pleased to find out that he had an enormous crop of tiny seedlings beneath his specimen. He carefully potted them up and tended them in his cold frames in the wintertime. These seedlings are now being cared for at the Missouri Botanical Garden, and we all eagerly await the Ph.D. dissertation that is in progress by the botanist who visited Edgar to learn about the St. Louis golden larch!

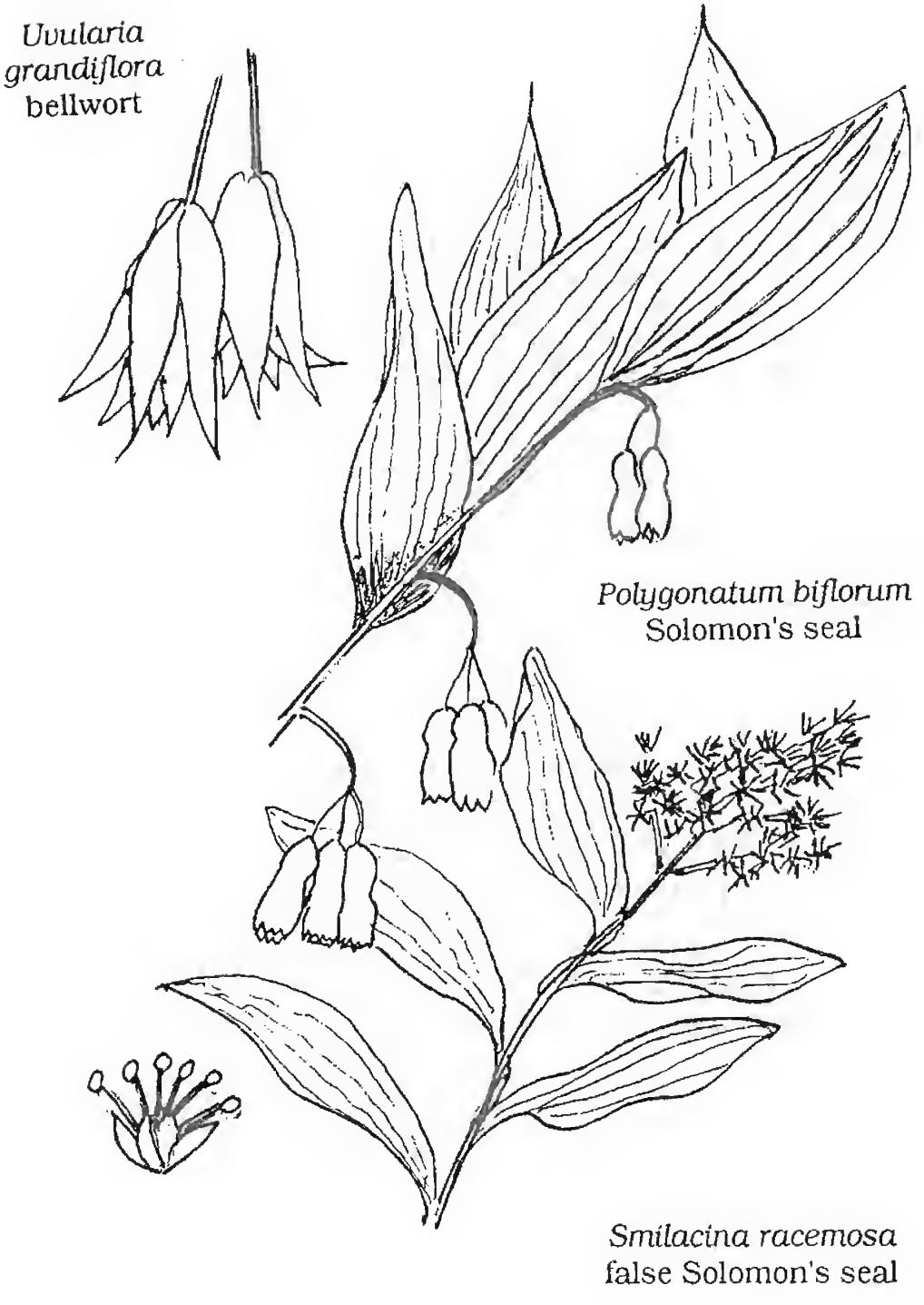
COMMON PLANT FAMILIES OF MISSOURI, II. MONOCOTS

Edgar Denison†
Kirkwood, Missouri

The nearly 2700 species of vascular plants growing in Missouri can be grouped into about 170 families. This great number of species provides a challenge for the botanist or amateur who wishes to identify a particular specimen. Fortunately, the vast majority of Missouri's plants belong to fewer than 25 families, thus the ability to recognize a small set of common plant families can make the job of species determination much simpler. In the fourth (1989) edition of my *Missouri Wildflowers* guide I ventured to compile a table that contrasted various characteristics of these common plant families. The present account is intended to expand upon the information in my earlier table, and deals with four common families of monocots to be found in Missouri. Two additional families, the grass family (Poaceae or Gramineae) and the sedge family (Cyperaceae) are especially complicated and deserve separate discussion in a future article.

THE LILY FAMILY—LILIACEAE

There are about 4,600 species worldwide in this family, of which only 34 grow as natives in Missouri. However 15 additional species have become established as escapes from cultivation. The native genera of Missouri Liliaceae are *Allium* (wild onions, ramps), *Amianthium* (fly poison), *Camassia* (wild hyacinth), *Erythronium* (dogtooth violet), *Hymenocallis* (spider lily), *Hypoxis* (yellow star grass), *Lilium* (lily), *Maianthemum* (false Solomon's seal), *Medeola* (Indian cucumber root),

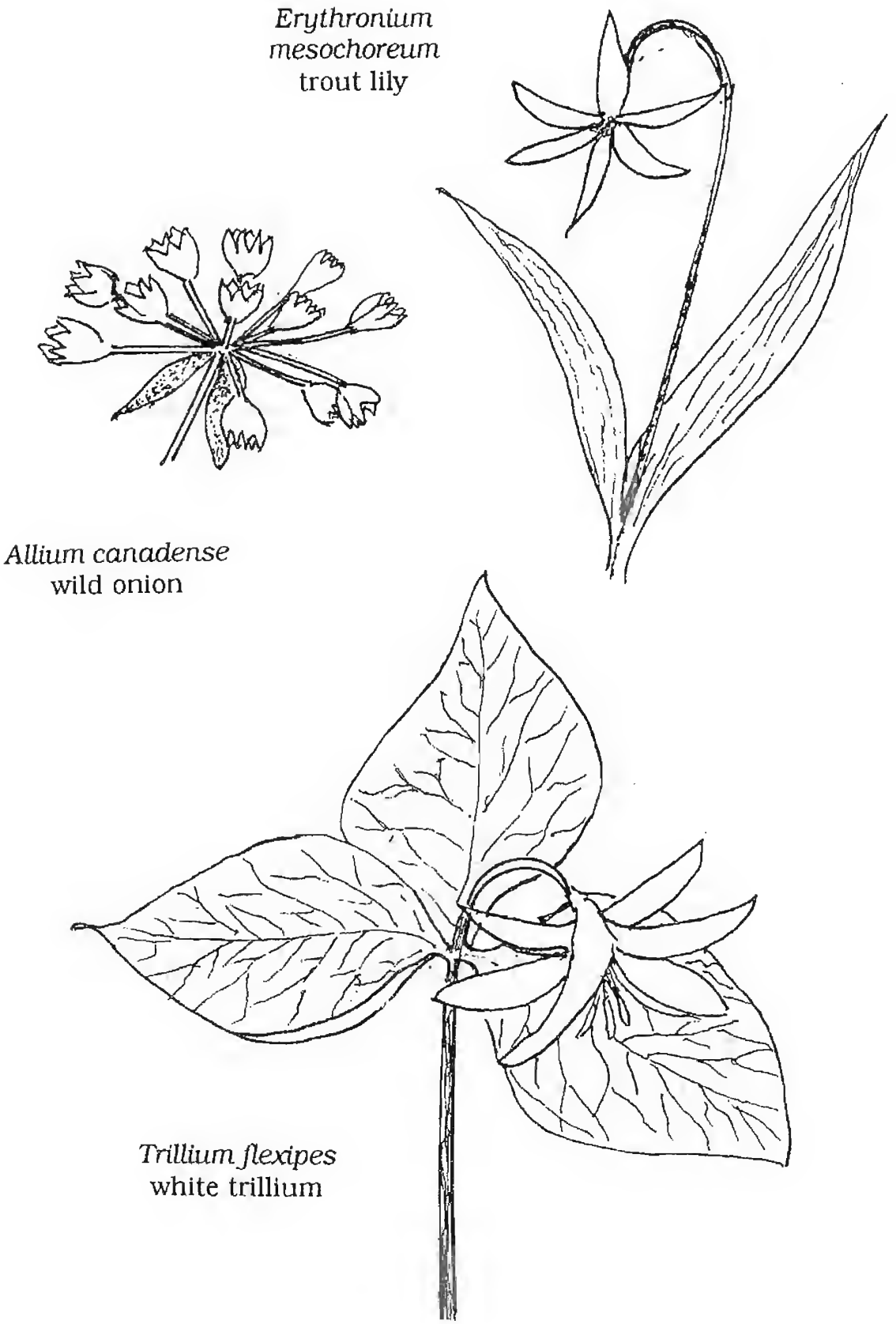


Examples of the lily family

Melanthium (bunchflower), *Nothoscordum* (false garlic), *Polygonatum* (Solomon's seal), *Stenanthium* (featherbells), *Trillium* (wake robin), *Uvularia* (bellwort), *Veratrum* (false hellebore), and *Zigadenus* (death camas). Three additional genera, *Manfreda* (American aloe), *Yucca* (soapweed), and *Smilax* (greenbrier), are no longer treated as Liliaceae by most botanists. The garden escapes include some onions, chives, and garlic (*Allium*), asparagus (*Asparagus*), lily of the valley (*Convallaria*), day lilies (*Hemerocallis*), snowflake (*Leucojum*), tiger lily (*Lilium*), grape hyacinth (*Muscari*), jonquils (*Narcissus*), star of Bethlehem (*Ornithogalum*), and squill (*Scilla*).

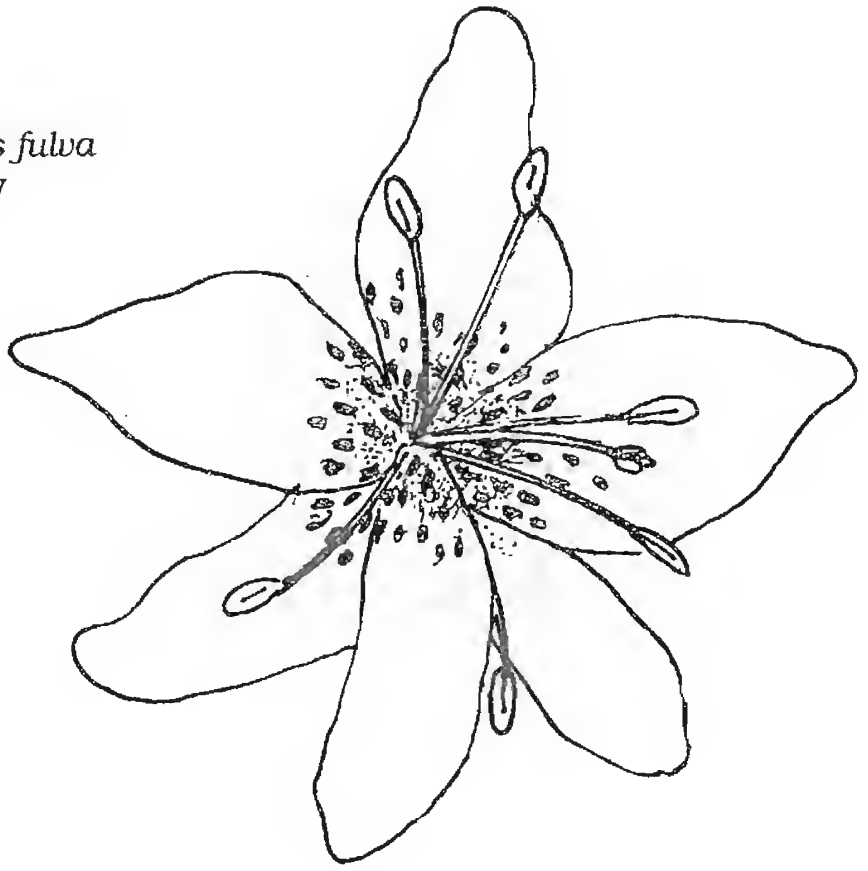
The flowers are 3-merous, that is they have flower parts in multiples of 3. There are 3 sepals and 3 petals, but these are often indistinguishable from one another and are then referred to as tepals. There are 6 stamens. The single pistil has 3 united carpels with 1 or 3 styles and stigmas. The fruits are either capsules or berries. The Liliaceae are quite variable in their inflorescence size and shape. Various genera produce umbels, spikes, panicles, axillary clusters, or single flowers. Vegetative reproduction is by fragmentation of underground structures such as rhizomes, corms, or tubers, as well as by production of "bulbils" in the leaf axils or inflorescences in some species.

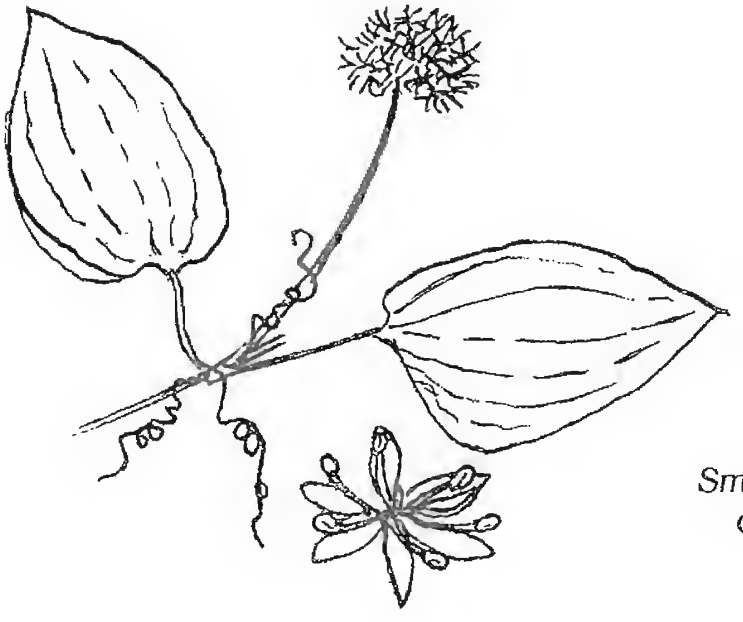
As befits the monocots, each seedling has only one cotyledon (seed leaf) and most of the species have simple (undivided) leaves with parallel veins. The leaves are alternate on the stems or all basal. Sometimes there is only a single pair of leaves, which can appear opposite, or a whorl of leaves.



Examples of the lily family

Hemerocallis fulva
day lily





Smilax lasioneuron
carrion flower

Examples of the lily and greenbrier families

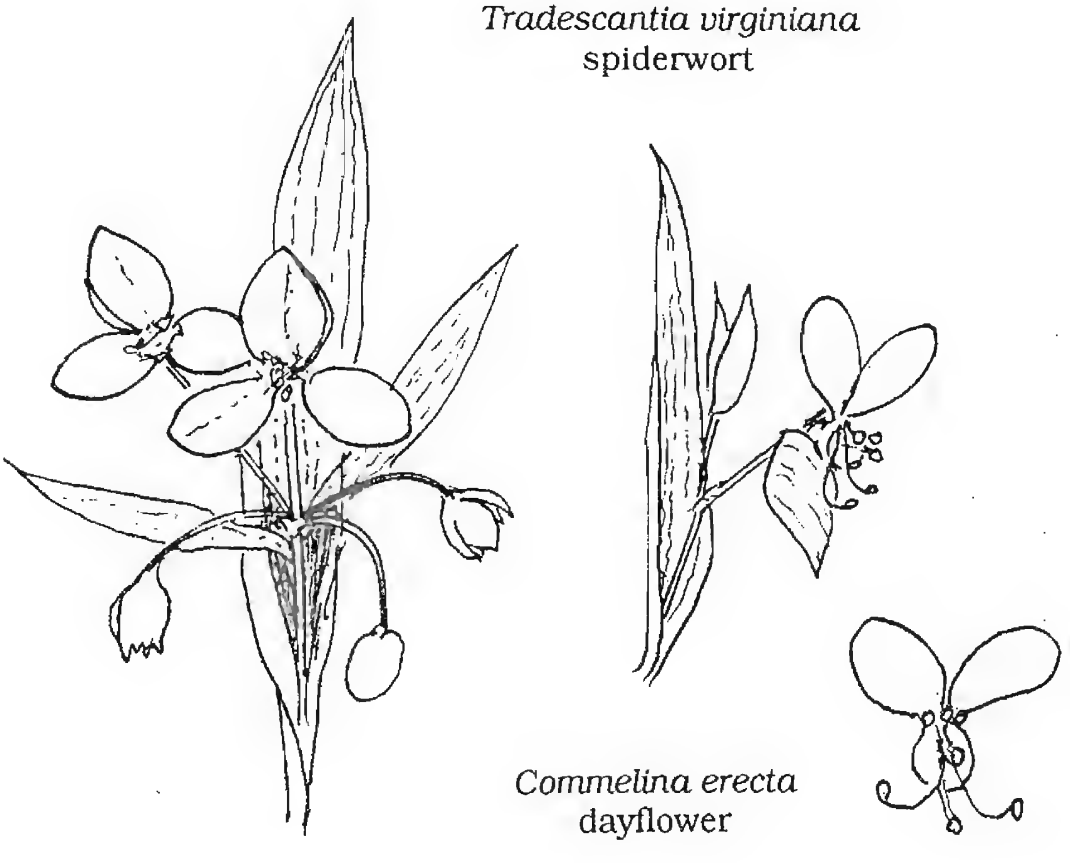
In Steyermark's *Flora of Missouri* (1963), a related family, the Amaryllidaceae, was also included as separate from the lily family. Since the publication of Steyermark's Flora there has been great controversy as to the proper limits for the plants in these families. Most specialists now agree that the family Liliaceae needs to be split up, because plants such as onions, greenbriers, and soapweed appear to be only distantly related. The disagreement involves how many families to recognize and how to tell these segregates apart consistently.

At the extreme, some authors favor a system that splits the Missouri species into thirteen separate families in several botanical orders. Yatskievych and Turner, in their 1990 *Catalogue of the Flora of Missouri*, follow a compromise system that recognizes three families in place of Steyermark's two. The Liliaceae and Amaryllidaceae of Steyermark's Flora are generally combined, but the "woody" genera with leaves in a basal rosette whose relatives live in the deserts of the southwestern United States and Mexico are separated into the Agavaceae, and the greenbrier genus, *Smilax*, is segregated into the Smilacaceae. The eventual resolution of this controversy awaits further studies.

THE SPIDERWORT FAMILY—COMMELINACEAE

Although somewhat smaller than the lily family, the mostly tropical Commelinaceae still number over 600 species, several of which are cultivated as garden or house plants. In Missouri, the eleven native and two introduced species are included in two genera. *Commelina*, the day flowers, contains three native and two introduced species, whereas the spiderwort genus, *Tradescantia*, includes the remaining eight natives.

Flowers of the Commelinaceae are 3-merous, with 3 sepals and 3 petals, and in *Commelina* one of the petals is often much smaller than the other two (the genus was named for the seventeenth century botanists Jan and Kaspar Commelin, who had a third botanical brother who died young). The stamens are usually the same color as the petals, and the anther stalks are usually densely covered with fine, cobwebby hairs. In *Tradescantia* all 6 stamens function to produce pollen, but in *Commelina* 3 of the stamens are modified into staminodes, which do not produce pollen, but presumably function to attract insects in some manner still not completely understood. Each flower contains 1 pistil with 3 carpels. The fruits are capsules. The flowers of the Commelinaceae are usually produced in clusters that are subtended by a large bract. Individual flowers are quite short-lived, staying open only part of a single day.



Tradescantia virginiana
spiderwort

Commelina erecta
dayflower

Species of Commelinaceae are distinguishable from those of the Liliaceae by a combination of features. The long-hairy anther stalks of the stamens are not found in the Liliaceae of Missouri. Most Liliaceae have the sepals and petals of similar color and texture, whereas in the Commelinaceae the sepals are green and herbaceous. A few Missouri Liliaceae, such as species of *Trillium*, do have green sepals, but these have leaves in a whorl of 3 and the flowers single, rather than clustered.

THE IRIS FAMILY—IRIDACEAE

The nearly 1,900 species of Iridaceae are distributed almost worldwide and include a number of familiar garden ornamentals. In Missouri there are four genera containing ten native and six introduced species. *Belamcanda*, the blackberry lily, contains only one introduced species in the state. *Iris*, a large genus that contains numerous ornamental species, is the largest Missouri genus in the family, with four native and five introduced species. *Nemastylis*, the celestial lilies, is a small genus found only in North America, and includes two native species, one day-flowering and the other night-flowering. Blue-eyed grass, *Sisyrinchium*, contains four native species in Missouri.

The flowers have 3 petals and 3 sepals, these usually of similar texture and color, but sometimes with different shapes. There are 3 stamens and 1 pistil with 3 carpels. The fruits are capsules. The "blackberry" of the blackberry lily is the cluster of dark, fleshy seeds exposed when the capsule splits open.

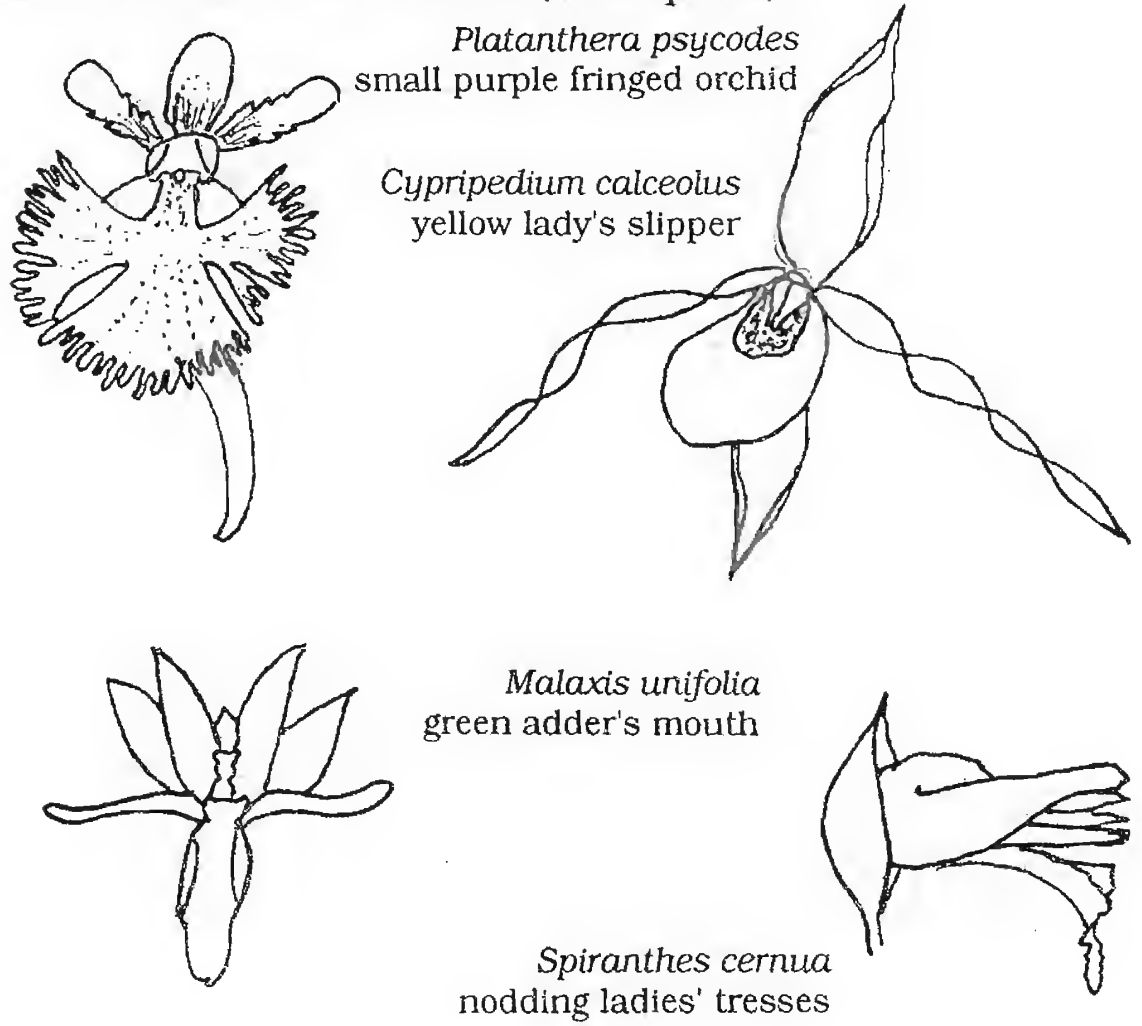
Some genera of Iridaceae, such as *Iris*, have unique and complex flowers, but others have flowers that resemble those of the Liliaceae. Two characters reliably separate the Iridaceae and Liliaceae. The flowers of Liliaceae have six stamens, but those of the Iridaceae have only three, and the ovary of each flower is superior in the Liliaceae, that is with the sepals, petals and stamens attached at its base, but is inferior in the Iridaceae, with the other floral parts attached at the top of the ovary.

THE ORCHID FAMILY—ORCHIDACEAE

With estimates ranging upward to 30,000 species, the Orchidaceae have been called the largest family of flowering plants in the world. Although most common in the tropics, orchids are distributed worldwide. Numerous species are cultivated for their unusual and showy flowers. In Missouri, there are 34 species, all native except for the hellebore, *Epipactis helleborine*, a garden escape. Most are quite uncommon in the state. The native genera include *Aplectrum*, (putty root), *Calopogon* (grass pink), *Corallorhiza* (coral root), *Cypripedium* (lady's slipper), *Galearis* (orchis), *Goodyera* (rattlesnake plantain), *Hexa-lectris* (crested coral root), *Isotria* (whorled pogonia), *Liparis* (twayblade), *Malaxis* (adder's mouth), *Platanthera* (fringed orchid), *Pogonia* (snake mouth orchid), *Spiranthes* (ladies' tresses), *Tipularia* (cranefly orchid), and *Triphora* (three bird orchid).

The complex flowers of the orchids are unique among the flowering plants. In most genera, the flowers twist during development, so that the open flower is actually upside down compared with those in other families. There are 3 sepals that sometimes resemble the 2 lateral petals in size and shape. Of the petals, the 2

lateral ones are usually similar in appearance, but the third is modified into a specialized lip, sac (slipper), or spur. The stamen (usually only 1 functional one exists, but *Cypripedium* has 2) and pistil are combined into an "androgynoecium" (Greek: male and female structure) commonly called the column, with the anthers and stigmas separated by an expanded structure known as a "rostellum," The pollen is shed as sticky, saclike masses called "pollinia," rather than as individual grains. These pollinia stick to insects that visit the flower and are transported to another flower, where they are transferred to the stigma. The ovary is inferior, and the fruits, which are variously shaped capsules, produce large amounts of tiny, dustlike seeds that are short-lived and lack built in nutrients (endosperm).



Platanthera psycodes
small purple fringed orchid

Cypripedium calceolus
yellow lady's slipper

Malaxis unifolia
green adder's mouth

Spiranthes cernua
nodding ladies' tresses

Although all of the Missouri orchids are "terrestrial" and live in soil, many of the tropical species live as "epiphytes" (Greek: living upon plants) attached to tree bark or branches. A few genera are "saprophytes," unable to produce chlorophyll and living on decaying organic matter through an association with various fungi in the soil. All orchids, whether green or not, require a symbiosis with specific fungi in order for the seeds to germinate and the plants to grow. The fungi assist the orchids with nutrient and water uptake through the roots. In many cases the fungal species have rather narrow requirements for their growth. Thus transplanting of terrestrial orchids from the wild to a garden is usually unsuccessful, because of difficulties in establishing the symbiotic fungi at new sites, and is strongly discouraged. Most of the many species of orchids in cultivation are epiphytes from tropical regions, which are easier to raise (and unfortunately, to transplant from the wild into greenhouses). Recently, botanists have had some successes in raising terrestrial species from seeds in a test tube, using techniques of tissue culture.

ANNOUNCEMENT

The Society official archives are housed at the Missouri Botanical Garden. In addition, copies of plant lists and other information relating to the flora are requested for inclusion in the Society's flora file. Please send items to the archivist, Jim Bogler (see address on inside front cover).

BOOK REVIEWS

Marshall, Nina T. 1993. The Gardener's Guide to Plant Conservation. World Wildlife Fund. xiv, 187 pp. ISBN 0-89164-139-4. Order from World Wildlife Fund, P.O. Box 4866, Hampden Post Office, Baltimore, MD 21211 (tel. 410/516-6951). $12.95. Paperbound.

This marvelous book is unique in its attempt to educate gardeners on where the plants that they purchase may originate from. Based on a 1989 technical report to the World Wildlife Fund by Sara Oldfield, this easily understood, expanded guide was published under the auspices of the WWF, the Garden Club of America, and TRAFFIC USA (part of an international WWF arm that monitors trade in wildlife and wildlife products). The book contains much interesting information; amateurs may be especially interested to learn where some of the commonly cultivated plants grow natively. For example, *Iris pallida*, one of the introduced blueflags commonly cultivated in Missouri, is native to Yugoslavia (but has been propagated in this country for a long time and is not greatly threatened in the wild by horticultural collection).

The main portion of the book consists of several tables, covering North American wildflowers, bulbs, insectivorous plants, and terrestrial orchids. Sadly, cacti and succulents are not covered at all. Each table is organized by scientific name and contains common name, information on whether the species is commercially wild-collected or nursery propagated, and notes on each species, native range, and conservation status. For example, the entry for *Erythronium albidum* notes that the plant is also called white dog's-tooth violet or white

trout lily, indicates that both wild collection and nursery propagation are occurring, and then notes that the plant is native to East-central North America, that most plants in the nursery trade are wild-collected, and that the plant is of special concern in the following states: Alabama (rare); Louisiana (critically imperiled); Maryland (protected and listed as threatened); Mississippi (critically imperiled); and Virginia (imperiled).

Supplementing the body of the book are a series of introductory chapters that cover such topics as wild plants in trade, wild plant collection in perspective, the gardener's role, and making a difference. The bottom line is that gardeners should be aware of which species are represented in the horticultural trade primarily by plants removed from the wild, and that the purchase of such plants should be avoided. The book discusses the historical development of the trade in wild plant materials, particularly the bulb trade, and the detrimental effects of this commerce on the species themselves and the habitats in which they reside. It is a relief to find that some of the plants listed in the book, such as *Muscari botryoides* (the common grape hyacinth) and all of the *Coreopsis* species, are primarily propagated in nurseries, and are not in danger from overcollection in the wild for the nursery trade. Readers should also note the useful, annotated list of sources for further information, which is toward the end of the book, just before a glossary and an extensive bibliography.

This book is important for any gardener with an interest in plant conservation, as well as for those who want to know more about cultivated plants, native or exotic. The well-written text and beautiful selection of photos make it well worth the modest price. The sponsoring organizations are to be congratulated on

producing an attractive, useful, and affordable book on a topic of great current relevance.

George Yatskievych
Flora of Missouri Project

Flora of North America Editorial Committee. 1993. Flora of North America, North of Mexico. Vols. 1 & 2. Oxford University Press, New York. Vol. 1—xxi, 372 pp., $75 (ISBN 0-19-505713-9) Vol. 2—xvi, 475 pp., $75 (ISBN 0-19-508242-7) Both volumes hardbound.

The first two volumes of the long anticipated *Flora of North America* are now available. This colossal project, which traces its origin to the formation of a committee to study feasibility of such an undertaking in 1964, will eventually fill fourteen volumes covering the vascular plants and bryophytes. The Missouri Botanical Garden is heavily involved in the project, with Assistant Director Nancy Morin serving as the convening editor. The Garden's computer database, TROPICOS, serves as the repository for the storage of all information in the published volumes as well as more detailed data.

Volume one is an introductory volume dedicated to Dr. Peter H. Raven for his support of the project. It contains fifteen chapters by various authors covering topics ranging from the climate, soils, past and present vegetation of the continent, to the history of botanical exploration and the effects of humans on the flora. It concludes with five chapters on classification systems and the species concept. MONPS members will recognize

the contributions of two of our members to the introductory volume. George Yatskievych co-authored Chapter 10—"Plant Conservation", and Paul Nelson's line drawings of several ferns appear in Chapter 12—"Pteridophytes."

I found several chapters of the introductory volume to be written at a technical level that will be tedious reading for the non-specialist. The four chapters dealing with "Humankind and the Flora," in contrast, seemed well-suited to a general audience. The first of these, Chapter 7—"Taxonomic Botany and Floristics," is a particularly interesting account of the continent's botanical exploration and floristic documentation, liberally illustrated with portraits and photographs of some eminent botanists of the past. The chapters on "Weeds" and "Plant Conservation" discuss clearly a number of topics that will be familiar to many MONPS readers.

Volume 2, *Pteridophytes and Gymnosperms*, is the first of twelve volumes that will be devoted to the floristic account of the plants of North America, north of Mexico. It contains the identification keys, descriptions, habitat summaries, and synonymies that have become the standard in most regional and state floras. Range maps at a continental scale are provided for each taxon, and an average of one in three taxa is illustrated. The line drawings are well done, if somewhat crowded, with typically three to five taxa illustrated on one-third of a page.

I found the identification keys to be clearly written, but due to the sheer numbers of taxa within the scope of this flora, one would usually have an easier task of keying in more local manuals. For identification of species new to a region, however, the flora will be an invaluable reference, as all of the likely possibilities from

adjacent regions will be contained in the keys. The considerable taxonomic revision that is incorporated into the flora as well as the non-alphabetical ordering of the families will necessitate many users beginning their search for a species' description by consulting the index, in which all synonyms are included.

Both volumes were rigorously edited, as evidenced by the rarity of misspellings and typographical errors. Some pages of my volumes contain flecks of yellow fibers that are somewhat distracting on the otherwise white paper, but this does not significantly detract from the generally fine quality of these handsome volumes.

The *Flora of North America, North of Mexico* will stand for many years as the most current synthesis of information on the continent's flora. I recommend the introductory volume to any serious student of the North American plants. The less technical chapters will also be of interest to more general readers of botanical literature. The second volume is a must for the Pteridophyte or Gymnosperm specialist. Although it a valuable reference for plant identification for any student of the flora, the eventual cost of acquiring additional volumes may prevent some individuals from purchasing the complete flora.

Tim Smith
Missouri Department of Conservation

Homoya, Michael A. 1993. Orchids of Indiana. Indiana Academy of Science. *xix*, 276 pp. ISBN 0-253-32864-0. Order from Publications, Indiana Academy of Science, 1102 N. Butler Ave., Indianapolis, IN 46219 (tel. 317-352-1970). $ 37.50 postpaid. Hardbound.

Orchids receive a degree of attention disproportionate to their representation in temperate floras. This may in part be due to the fact that these fascinating plants have unique flowers and pollination mechanisms, are dependent upon other organisms for their germination and survival, and in many cases are obligately restricted to our highest quality natural areas. Thus, we have available a plethora of works about orchids, ranging from popular to technical, conceptually encompassing areas from small regions to whole continents.

With so many orchid works covering portions of the Midwest, it is a mighty task to produce a book that breaks new ground and serves as a meaningful contribution to our knowledge of the orchid flora. *Orchids of Indiana* is the best treatment of a state's orchid flora to be published. The book is eminently readable, clear, informative, and logically arranged. Initial sections cover a concise history of Indiana orchidology, and general discussions of orchid biology, taxonomy, and ecology. I especially appreciated a well-presented table providing information of the comparative phenology of Indiana orchids. There is a good discussion of the natural vegetation types of Indiana, including a color map of the state's natural regions, color photographs of specific habitats, and an interesting diagram of Indiana's orchids juxtaposed in their typical habitats.

The main section of the work starts with a dichotomous key to the genera of Indiana orchids, followed by alphabetically arranged generic keys and individual treatments of each taxon. Each of these treatments is a detailed discussion, including sections on the origin of the Latin name, morphological descriptions, a shaded map of the range of the taxon in

North America, a county map and detailed description of the Indiana range, a habitat description, and a delightful section including a wealth of information based largely on the author's extensive field experiences with the plants. Each orchid is superbly depicted in two to several color photographs showing the habit, flowers, fruits, and foliage. Final sections include a discussion of excluded species, glossary, checklist and pronunciation guide, list of common and scientific names for all plants mentioned in the book, bibliography, and index. The text is readable and generally non-technical without sacrificing accuracy or information. In addition to a wealth of stunning photographs, Missouri's own Paul Nelson has provided numerous excellent line drawings to show morphological details or differences among closely related species, such as in the genus *Spiranthes*.

This book is a living treatment of the orchids—read it, and you will come to know the orchids as entities inextricably linked with the myriad of special habitats they occupy, almost like a surrogate field trip. This is greatly enhanced by the carefully distilled habitat descriptions for each species, which also include some characteristic associates. I think most works of this type fail in relating their subjects to the landscape and biota they are interdependently intercalated with, but this work succeeds admirably in emphasizing these relationships.

It seems to be fashionable these days, regardless of how laudatory the review, to point out a least a few token errors or shortcomings. In this case, I am so impressed by this work that no criticisms come to mind. All right, if pushed, I would mention that the discussion of mycorrhizal interrelationships is brief to the point of sacrificing clarity. It would have been helpful to explain these interrelationships more clearly, since this is an

aspect of orchid biology that most readers will have the least familiarity with. I would also have liked an illustration or photograph of an orchid embryo and its associated hyphae—most readers will wonder what a mycorrhizal fungus looks like. As another minor point, the role of fire was not accorded sufficient discussion, but is briefly discussed in conjunction with a variety of other "disturbances." In light of the recent spectacular responses of some orchids to fire in other Midwestern states, it might have been useful to expand this discussion for specific habitats. Lastly, the captions for the full page plates are inconsistently and somewhat confusingly arranged. These however, are minute, subjective points, and their trivial nature underscores the comprehensive thoroughness of this book.

Missouri botanists will also benefit from the book, both for general information, and as a local reference. All but two of the thirty-seven species of orchids known from Missouri are treated in this book (and who ever gets to see *Isotria medeoloides* or *Platanthera praeclara*!). Indiana has a richer orchid flora than Missouri, encompassing 47 taxa in 42 species. Mike Homoya has produced a well thought out, insightful work, and the Indiana Academy of Science has emulated the author's painstaking attention to detail, accuracy, and presentation in producing this exemplary work. Building on the fine traditions established by Frederick Case's *Orchids of the Western Great Lakes Region*, Bill Summers' *Missouri Orchids*, and others, *Orchids of Indiana* makes a quantum leap and sets a new standard for this type of treatment. It is at once beautiful and utilitarian, and a worthwhile addition to the plant enthusiast's library.

Doug Ladd
The Nature Conservancy